

REMARKS/ARGUMENTS

Claims 1-29 are active in the case. Claims 13-29 stand withdrawn from consideration. Reconsideration is respectfully requested.

Invention

The present invention is directed to an aqueous dispersion comprised of a silicon dioxide powder that has a silicon dioxide content of 10 to 60 wt %. The dispersion contains at least one which is at least partially soluble in aqueous solutions in the pH range of 2 to 6. The compound provides polyvalent cations which interact with the anionic surface of the silicon dioxide. The polyvalent cations are stable in the silicate environment as an anionic component of the particle surface of the SiO<sub>2</sub> powder. The quantity of cation-providing compound in relation to the surface of the silicon dioxide is 0.001 to 0.1 mg cation-providing compound per m<sup>2</sup> of SiO<sub>2</sub> surface. The product dispersion has a zeta potential of  $\leq 0$ .

Claim Rejection, 35 USC 102

Claims 1-12 stand rejected based on 35 USC 102(b) as anticipated by Field, WO 00/20221. This ground of rejection is respectfully traversed.

The WO '221 reference indeed discloses the preparation of an aqueous silicon dioxide dispersion that is stable in the acid range. The reference on page 3 discloses an aqueous dispersion of cationic silica with the dispersion having a pH ranging from about 2 to about 6. The dispersion is produced by bringing the silicon dioxide particles into contact with aluminum compounds in an aqueous medium as described on pages 11 and 12 of the reference. As stated at page 12 of the reference, the fact of the cationic coating of the silicon dioxide particles with aluminum and the extent to which the silicon dioxide particles are coated with aluminum is provided by measuring the zeta potential of the dispersion of the

silica being cationized. The Examiner notes that the amount of cation-providing amphoteric compound to the surface area of the silicon dioxide is provided and also "the size of each fall within the ranges called for in the instant claims" (page 2, last paragraph of the Office Action). The reference on pages 8 to 10 has an extensive discussion on the particle size diameters of the forms of silica that can be used. However, there is no disclosure of the surface area of any such silica that is used. Therefore, it is not possible to calculate a range of the amount of cation-providing compound relative to the surface area the silicon dioxide surface for the aqueous dispersion of the reference.

The Examiner also states on page 2 of the Office Action that "at a certain point, the aqueous dispersion of the reference possesses a negative zeta potential as set forth in Fig 1 of the reference." Applicants do not concur with the Examiner's inference that at some point the dispersion of the reference, as typified in Example 1 (Fig 1), has the same less than zero negative zeta potential as the product dispersion of the present invention. Claim 1 of the present application clearly states that the product aqueous dispersion that has a quantity of cation-providing compound ranging from 0.001 to 0.1 mg per m<sup>2</sup> of silicon dioxide surface, also has a negative zeta potential of less than zero. Example 1, as illustrated by Fig 1, does not describe such an aqueous dispersion. What Fig 1 of the reference shows that the initial aqueous silica suspension, before treatment with aluminum chlorhydrate (cation-providing compound), has a zeta potential less than zero. A first of six 3 ml aliquots of aluminum chlorhydrate solution is then mixed into the dispersion. After this first admixture of aluminum chlorhydrate solution, the zeta potential had already increased well beyond zero potential to a potential well in excess of zero at about 9 mV. Thus, the incompletely prepared (five 3 ml aliquot samples of aluminum chlorhydrate solution to follow) silica dispersion of Example 1 already possessed a zeta potential initially much greater than the zeta potential limitation of the present claims. Fig 1 shows that, in fact, after the addition of all six aliquots

of aluminum chlorhydrate solution to the dispersion, the final zeta potential is near 30 mV!

Thus, the zeta potential of the aluminum chlorhydrate treated silica dispersion of the reference is well in excess of the maximum 0 mV potential of the present claims.

Regarding the Examiner's comments in paragraph 3 of the Office Action, the Examiner does not appear to recognize that, whereas the claimed aqueous treated silica dispersion product of the present invention has a zeta potential less than zero, in the Field reference, the product aqueous silica dispersion, as described in Example 1, is only formed after the addition of six 3 ml aliquots of the aluminum chlorhydrate solution to the initially prepared silica dispersion. Once this process of addition and mixing is completed, the aqueous dispersion of the reference has a zeta potential of near 30 mV. While it is true, as the Examiner has stated, that as the first aliquot of aluminum chlorhydrate solution is added to the silica dispersion, the zeta potential, starting from an initial potential of about -2 mV, passes through a range of values up to the maximum value of 9 mV, this high potential value is attained long before a product treated aqueous silica dispersion is prepared. In fact Fig 1 shows that as the first aliquot of aluminum chlorhydrate solution is added to the silica dispersion, the zeta potential already has increased beyond 0 mV before the first ml of the first aliquot of aluminum chlorhydrate solution has been added. Given the discussion above, applicants emphatically disagree with the Examiner's comment at the end of paragraph 3 that "the aqueous dispersion of the instant invention as claimed is attained during passage through this range of negative values." After the addition of less than the first ml of aluminum chlorhydrate solution of the first of six aliquots in Example 1 of the reference, the silica dispersion is only partially treated with the aluminum chlorhydrate, with the dispersion already exhibiting zeta potentials passing beyond 0 mV! The dispersion at this early stage of treatment with aluminum chlorhydrate is not the fully treated (with cation-providing

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compound) of present Claim 1. Clearly, the '221 reference does not anticipate the present invention as claimed and withdrawal of the rejection is respectfully requested.


It is now believed that the application is in proper condition for allowance. Early notice to this effect is earnestly solicited.

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